

## Genital infections with *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in Ghanaian women

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**SUMMARY** Women who attended the gynaecology clinic or were admitted to the postpartum ward of Korle Bu Hospital, Accra, Ghana were tested for infection with *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. Eight (4·9%) of 162 gynaecological patients were infected with *C trachomatis* and five (3·1%) with *N gonorrhoeae*, and respective prevalences among 148 postpartum women were 7·7% (3/39) and 3·4% (5/148). Among 40 gynaecological patients who were not pregnant and whose principal complaint was of lower abdominal pain, 4 (10%) were infected with *C trachomatis* and none with *N gonorrhoeae*. Antibodies against serovars D, E, F, and G were common, and three typable isolates were serovar G. *C trachomatis* would appear to be more common than *N gonorrhoeae* in obstetric and gynaecological patients in Ghana.

### Introduction

*Chlamydia trachomatis* is probably the most common sexually transmitted pathogen in industrialised countries,<sup>1-3</sup> and as shown in a few surveys it is also common in Africa.<sup>4-8</sup> We undertook the study reported here to estimate the prevalence of genital infections with *C trachomatis* and *Neisseria gonorrhoeae* among women living in a suburb of Accra, Ghana.

### Patients and methods

We used calcium alginate swabs (Calgiswab type III, Inolex, Glenwood, Illinois, USA) to collect endocervical specimens for culture of *C trachomatis* and *N gonorrhoeae* from 162 newly registered, randomly selected women attending the gynaecology outpatient clinic at Korle Bu Hospital in Accra, and from 39 unselected postpartum women admitted to the hospital's maternity ward. Material from another 109 postpartum women was cultured for *N gonorrhoeae* only. Using microimmunofluorescence we tested serum from 95 of these 109 women for IgG and IgM antibodies to *C trachomatis*.<sup>9</sup>

Demographic data of the patients were recorded, and a history of recent use of antimicrobials was sought. Korle Bu is the teaching hospital for the University of Ghana. It primarily serves self referred indigent patients from Accra and patients referred from nearby doctors and clinics. Thus the population is skewed towards a high prevalence of serious diseases.

Specimens for isolation of chlamydiae were placed immediately in sucrose phosphate transport media, frozen at -70°C, and transported on frozen carbon dioxide to Seattle, where they were cultured in McCoy cells treated with cycloheximide.<sup>10</sup> Isolates of *C trachomatis*, as identified by fluorescein conjugated monoclonal antibodies,<sup>10</sup> were immunotyped in the indirect microimmunofluorescence test by immunising mice with the isolates.<sup>11</sup> Presumptive identification of *N gonorrhoeae* was confirmed by sugar utilisation tests, and isolates were tested for  $\beta$ -lactamase production with a chromogenic cephalosporin assay.<sup>12</sup> We tried to locate and treat all women infected with *C trachomatis* and *N gonorrhoeae*.

### Results

*C trachomatis* was isolated from eight (4·9%) of the 162 women attending the gynaecology clinic and from three (7·7%) of the 39 postpartum patients. *N gonorrhoeae* was isolated from five (3·1%) of the

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162 gynaecological patients and five (3.4%) of 148 postpartum patients. Isolates from one postpartum patient and from one gynaecological patient produced  $\beta$ -lactamase. No patient was found to be infected simultaneously with *C trachomatis* and *N gonorrhoeae*.

The presenting complaints of the newly registered women attending the gynaecology clinic are listed in table I. Lower abdominal pain was the most common complaint among non-pregnant women and was accompanied by signs of pelvic inflammation (cervical motion tenderness and adnexal tenderness) in most. Three of these women, from whom no pathogens were isolated, had recently taken antimicrobials. *C trachomatis* was isolated from four of them and *N gonorrhoeae* was isolated from none.

TABLE I Prevalence of *C trachomatis* and *N gonorrhoeae* in randomly selected gynaecological patients at Korle Bu Hospital presenting with various complaints

Presenting complaint	No (%) infected with:	
	<i>C trachomatis</i>	<i>N gonorrhoeae</i>
Related to pregnancy (n = 44)	0	2 (4.5)
Lower abdominal pain (n = 40)	4 (10.0)	0
Menstrual problems (n = 29)	3 (10.3)	1 (3.4)
Vaginal discharge (n = 11)	0	1 (9.1)*
Infertility (n = 9)	1 (11.1)	0
Other (n = 29)	0	1 (3.4)
Total (n = 162)	8 (4.9)	5 (3.1)

\*Producing  $\beta$ -lactamase.

Serum from 24 (25.3%) of the 95 postpartum women tested for antibodies to *C trachomatis* reacted at a titre of at least 1/8; IgM to *C trachomatis* was found in none of them. IgG titres ranged from 1/8 to 1/512. The antibody patterns against various serovar groups are listed in table II. A pattern of broadly reacting antibodies was most common. Serum from patients with specifically reacting antibodies reacted most commonly with the F,G group of serovars.

TABLE II Prevalence of antibodies to chlamydia in 95 postpartum women at a titre of  $\geq 1/8$

Serovar group	Number (%) of patients
Broad reaction	9 (9.5)
F,G	8 (8.4)
D,E,L <sub>1</sub> ,L <sub>2</sub>	3 (3.2)
F,G,L <sub>1</sub> ,L <sub>2</sub>	1 (1.1)
H	1 (1.1)
A	1 (1.1)
A,C,J,F,G	1 (1.1)
No antibody	71 (74.7)

Three isolates of *C trachomatis* from women in the gynaecology clinic could be revived for immunotyping; all were serovar G.

## Discussion

This study shows that genital infections with *C trachomatis* are more common than infections with *N gonorrhoeae* in Ghanaian women. The 10% prevalence of *C trachomatis* in women with lower abdominal pain suggests that it is an important cause of pelvic inflammatory disease (PID) in Ghana, perhaps more so than *N gonorrhoeae*, which was isolated from none of the 40 women with this complaint ( $p=0.12$ , Fisher's exact test). Self administration of antimicrobials is common in Africa but was generally denied by these women and would therefore have had little influence on our results.

Serological data and immunotyping of isolates suggest that infection with F,G group serovars is most common. This group was the second most common in a survey of genital infections in Seattle, Washington.<sup>13</sup> Conversely, the most common Seattle serovars (D and E) seem to be second in prevalence in Accra.

The prevalence of *C trachomatis* (7.7%) in postpartum women in Accra is remarkably similar to that found (5.6%) in antenatal clinic patients in Nairobi, Kenya<sup>5</sup> and the 6.7% found in such patients in Fajara, The Gambia.<sup>8</sup> Similarly, antenatal patients in Ibadan, Nigeria were found to have a comparable prevalence (10.3%) of antibody titres of  $\geq 1/16$  against serovars D to K compared with 9.5% in this study.<sup>6</sup>

Infection with *N gonorrhoeae* has been proposed as the cause for much of the infertility in Africa south of the Sahara,<sup>14</sup> but our survey suggests that *C trachomatis* may also be an important cause, as it is in the United States<sup>15-17</sup> and Finland.<sup>18</sup>

The difficulties of storage and transportation of chlamydial specimens certainly leads to an underestimate of the prevalence of chlamydial infection in Accra. Cell culture technology is unlikely to be adequately available in Africa in the foreseeable future, but the recent availability of direct examination of specimens with monoclonal antibodies<sup>19</sup> portends an improvement in the ability to diagnose these important agents of disease in developing countries.

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